DATA SYSTEMS - ASSIGNMENT 2

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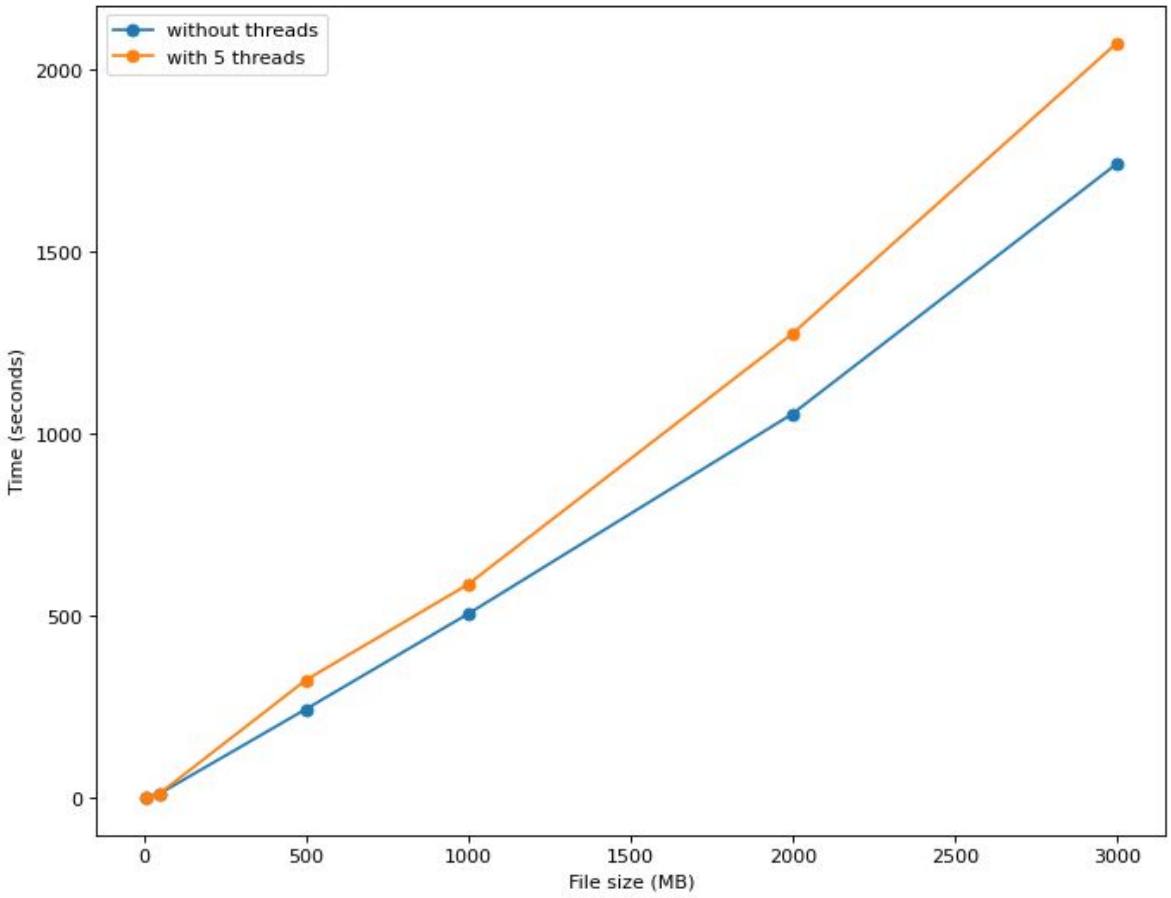
System Specs:

Processor: Intel(R) Core(TM) i7-5500U CPU @ 2.40GHz
Memory: 8GiB
Hard disk: 478G left
OS: Ubuntu 20.04.1 LTS

Results:

1. Fixed Memory: 100 MB

File Size (MB)	Time without threading (seconds)	Time with threading (seconds) - 5 threads
5	1.83	1.65
50	11.77	12.32
500	243.52	323.43
1000	505.34	586.52
2000	1055.19	1275.42
3000	1742.54	2074.29

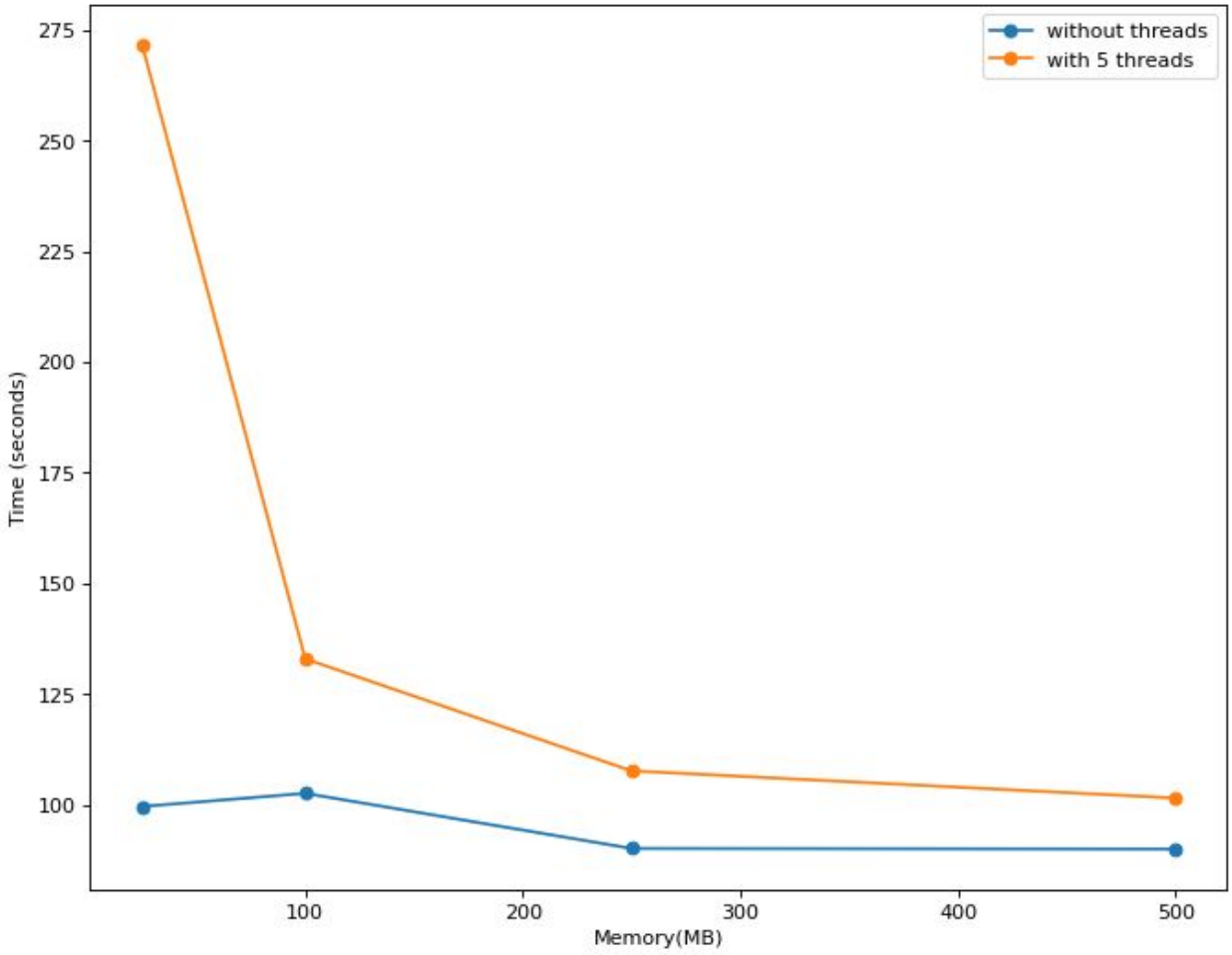


Observations:

1. Increasing the file size increases the time required, as expected.
2. Threading doesn't improve the time required for sorting as the memory is fixed and the number of subfiles generated will be more in case of threading, and here disk read/write is a bottleneck.

2. Fixed File Size: 500 MB

Memory (MB)	Time without threading (seconds)	Time with threading (seconds) - 5 threads
25	99.64	271.76
100	102.61	132.99
250	90.17	107.69
500	90.04	101.55



Observations:

1. Without threads, the time taken for sorting is almost the same for different memory sizes. This is because the bottleneck for two phase merge-sort is disk read/write.

2. With threads, the time taken to sort decreases drastically when more memory is available. This is because the number of subfiles generated will be less when memory is increased, which inturn implies less disk read/write.